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GEOMETRY.

378. Proposed by G. I. HOPKINS, A. M., Instructor in Mathematics and Astronomy, Manchester High School Manchester, N. H.

In the triangle AED, the lines BE and CE are drawn to the points B and C in the base of the triangle. If $AE=100$, $ED=125$, $BC=60$ and $\angle AEC=\angle BED=$a right angle, compute AB, BE, EC, and CD.

II. Solution by E. B. ESCOTT, University of Michigan, Ann Arbor, Mich.

The solution by A. H. Holmes is correct in principle, but he has made some numerical mistake. The method of successive approximation is not only easier, but has the advantage that the work checks itself (except the last operation).

Using Mr. Holmes' notation, we have,

$$4\sin\theta=5\sin\psi\ldots(1);$$
$$25\left(\frac{1}{\cos\psi}-\cos\psi\right)+20\left(\frac{1}{\cos\theta}-\cos\theta\right)=12\ldots(2).$$

Let $\theta=35°$. Then from (1), $\sin\theta=.4589$ and $\psi=27°\ 19'$, $\cos\psi=.8885$. In (2), the first member has the value 13.955.

Let $\theta=33°$. From (1), $\psi=25°\ 50'$. First member of (2)$=12.3445$.

Let $\theta=32°\ 34'$, $\psi=25°\ 30'\ 20''$. First member of (2)$=12.0065$.

Let $\theta=32°\ 33'$, $\psi=25°\ 29'\ 41''$. First member of (2)$=11.999915$.

The work can be shortened by using interpolation just as is done in using logarithm tables.

With these last values of θ and ψ, we get,

$$AB=58.635,\quad BE=59.608,\quad EC=63.830,\quad CD=78.485.$$

NOTES AND NEWS.

Dr. E. B. Stouffer, who received his Ph.D. degree from the University of Illinois in June, has been appointed instructor in mathematics in the same institution. M.

Miss Josephine Burns, who was a graduate student in the University of Illinois during the past year, has accepted a fellowship in mathematics in the University of Wisconsin for the coming year. M.

Dr. Thomas Buck and Dr. L. I. Neikirk resigned their instructorships in the University of Illinois to accept similar positions in the University of California and the University of Washington, respectively. M.

At the University of Illinois, Professor H. L. Rietz was promoted from an assisstant professorship to an associate professorship in mathematics. Professor Rietz gives courses on the theory of statistics and the mathematics of investment as well as courses in pure mathematics. M.

The fifth International Congress of Mathematicians will be held in Cambridge, England, from August 22 to August 28, 1912. It will be organized by the Cambridge Philosophical Society with the coöperation of the London Mathematical Society. This will be the first international congress of mathematicians to be held in an English-speaking country, and it is expected that a large number of Americans will attend. The preceding four congresses were held as follows: Zurich, Switzerland, August, 1897; Paris, France, August, 1900; Heidelberg, Germany, August, 1904; Rome, Italy, April, 1908. M.

B. G. Teubner of Leipzig announces that they have in preparation five large volumes on the teaching of mathematics in Germany. A number of parts have already appeared and can be purchased separately. The general titles of the five volumes are as follows: The higher institutions of learning in northern Germany, The higher institutions of learning in middle and southern Germany, Special questions relating to higher mathematical education, Mathematics in the technical schools, and Mathematics in the public schools and in the normal schools. Felix Klein of Göttingen is general editor of the series. M.

On April 5th of the present year the Spanish Mathematical Society was organized in Madrid, Spain. During the following month this Society began the publication of a monthly periodicel called *Revista de la Sociedad Matematica Espanola.* The first two numbers of this periodical contain 40 and 36 pages, respectively, and the subject matter of these numbers inspires considerable confidence in the success of the journal. It is divided into seven sections bearing the following headings: Biography, articles, bibliography, news, vocabulary, intermedium, and problems. American mathematicians should take an especial interest in this new Society and its journal in view of the extensive use of the Spanish language on this continent and in our recently acquired possessions. The rapid recent advances of Italy towards mathematical eminence may inspire us with the hope that the Spanish Mathematical Society may be the beginning of a new mathematical era among those who use the Spanish language. M.

Two matters of interest to mathematical readers received special attention at the meeting of the National Education Association in San Francisco in July. One was the presentation of the modified schemes of admission recently promulgated at Harvard University and at the Univerity of Chicago. The Harvard program was presented by Assistant Professor Davis of the department of physics, who gave in exceedingly clear manner a most illuminating exposition of Harvard's practice heretofore with reference to the admission of students, and of the proposed system which goes into operation for the first time this fall. In a word, the new plan is a well considered combination of certificates from the schools and examinations at the University. It is proposed to accept the statement from the schools as to the ground covered in the various subjects by the candidate and his general character and standing as a student during his preparatory course; and no longer to set examinations for the purpose of determining his *quantitative* attainment in all the varied ramifications of his four years' work. Examinations, however, will still be given, but of a different character from those of the past. They will be set in four different subjects, three of which are specified by the University and one is to be selected by the candidate. These will be given all at one time and only when the candidate is ready for admission. The purpose of the examination is entirely *qualitative,* namely, to ascertain the candidate's ability to think and to express himself along the line of his preparatory study, and with this in view he is allowed to choose his own subject for one of the tests, presumably the one which is his favorite and in which he can best display his real strength. These papers are not to be graded by any percentage system and there will be no *passing* in one or more of the *separate* subjects. The candidate will either be admitted *without conditions* on the strength of his general ability as shown in these examination papers and by his credentials from the school, or he will be rejected and debarred from further opportunity for trial at that time. This plan is without doubt a great improvement over the old one and will aid greatly both in bringing Harvard into closer touch with the public high schools from which source she has hitherto drawn comparatively few of her students, and also in confounding the host of mere coaching schools which have long prospered as expert crammers for Harvard's special type of quantitative examinations.

The new Chicago program was supported by Associate Professors O. W. Caldwell of the department of biology in the School of Education, and H. E. Slaught of the department of mathematics, both of whom were members of a large committee of the faculty who have had the matter under consideration for the past two years. As is well known, the University of Chicago admits students to its collegiate departments on certificates from accredited schools. Hence the question was not one of examinations in one form or another set by the University, but it was rather a reconsideration of the relations of the University to the schools and the development of a better scheme of *coöporations.* To this end a committee of five representatives of the University and five representatives of the secondary schools in the Middle West have been holding numerous all day sessions during the past year and the results of their work were continually available for the committee of the faculty above mentioned. The chief considerations embodied in the new programs adopted by the faculty last June may be summarized as follows, and it will be seen that these points refer not only to the work of the preparatory school but also to that of the University as related to the schools:

(1) *Itemized* specifications of the preparatory work are to be replaced by *group* specifications which will allow a wide range of selection but will demand *continuity* of work along two or three lines chosen by the pupil. Of the fifteen units required for admission a student from an accredited four years high school must present three units of English (the only specifically named subject), together with a major sequence of three units from one of groups: Ancient languages, modern languages, history, mathematics, science; a minor sequence of two units from another one of these groups; and finally two units chosen at will from these groups, making ten units in all from the standard academic subjects. The remainining five units of the fifteen he may present from any subjects which the accredited school accepts toward its graduation diploma.

(2) The *group continuity* thus demanded in the preparatory school must then be continued in the first year in college, as follows: (a) The student must continue the study of English as one of his freshman subjects. (2) He must also continue his major or minor sequence or in special cases a subject which he studied during his last year in the preparatory course.

(3) *Breadth of view* is assured by requiring the equivalent of two units in each of the groups: Modern languages, historical subjects (including economics and sociology), mathematics, sciences, either in the preparatory school or during the first two years in college.

(4) *Depth of attainment* is assured by requiring during the four years in college one sequence of nine majors in some chosen department or in related departments, and one sequence of six majors in some other department. (A major is a course four or five hours per week for twelve weeks.)

(5) It is further understood that the future accrediting of schools is to be based upon a carefully prepared system of comparative records running through both secondary school and college and that the mutual relationship and mutual responsibility of both school and college teachers are to be fostered and developed by a scheme of mutual visitation whereby the secondary teacher is to see how the pupil is handled in college and the college teacher is to come into closer touch with the problem as it presents itself to the schools.

It is believed that the scheme of corporation between the secondary school and the University will greatly aid in bridging the unwarranted and artificial chasm which has heretofore existed between them, will assist the student in his first year in college to avoid many of the fatal pit-falls which have beset him, and will enable the schools to devote themselves to the task of serving their communities most advantageously rather than to the patchwork business of meeting the arbitrary details of minutely specified college entrance requirements, since by this program any student who has successfully completed a four years' high school course and has devoted himself within reasonable limitations to *serious and prolonged study* of English and two other academic subjects may be admitted to college without conditions and may there find opportunity to continue his work for a college degree.

The question of special interest to teachers of mathematics is the fact that, according to the Chicago scheme, mathematics is made coordinate with modern an ancient languages, history and the sciences as *one* of five groups from which the two sequences must be chosen for college admission.

The other items of interest to teachers of mathematics is the preliminary report of the National Committee on Geometry which was presented at the meeting of the sections by the chairman, H. E. Slaught, of Chicago. This report is a pamphlet of about 80 pages reprinted from *School Science and Mathematics,* where it appeared in three installments in April, May, and June. The printed copies being in the hands of the audience, the whole time of the session was devoted to an exposition of the salient points by the chairman and to formal and informal discussion and criticism. As was to be expected a very large majority of the nearly two hundred present were teachers from the Pacific Coast, and the warmth and interest manifested in the discussions were characteristic of the free and untrammeled spirit of the West. A full report of the meeting will be printed in the proceedings of the Association, including the historical introduction of Professor Cojari. The remaining portions of the report will be carefully gone over by the committee during the present year in the light of all the suggestions and criticisms received and will be presented as a final report at the meeting of the Association next summer.

It may be said that very few unfavorable criticisms have been received from any source, and these are of minor importance, while the favorable comments are many and strong. The two points most ardently commended are (1) the attempt to distinguish the theorem of geometry on the basis of emphasis and to enable the teacher to get a view point of perspective in the subject, and (2), the attempt to improve the point of view with respect to problems and exercises.

An appropriation was voted by the finance committee of the Association for printing a large edition of the reports as soon as the committees shall be able to put the work into final form, at which time announcement will be made as to the terms on which it may be obtained by all who wish to receive it.

Professor A. L. McCarty is now at the head of the Department of Mathematics in the State Normal School, Cape Girardeau, Mo. F.

Professor Alois F. Kovarik has just returned to his work in the Department of Physics in the University of Minnesota, after a two years' leave of absence in research study in radio-activity with Professor Rutherford in England. F.

Professor B. F. Yanney, formerly of Mount Union College, is now at the head of the Department of Mathematics in Wooster University, Wooster, Ohio. F.

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BOOKS.

Elements of the Differential and Integral Calculus. By Wm. Anthony Granville, Ph. D., President of Pennsylvania College, with the Editorial Co-operation of Percy F. Smith, Ph. D., Professor of Mathematics in the Sheffield Scientific School of Yale University. Revised Edition. 8vo. Cloth. xv+463 pages. Price $2.50. Boston and Chicago: Ginn & Co.

This book has been very favorably received by teachers of the Calculus. Portraits of the two discoverers of the Calculus are inserted in the present edition. F.

Physical Measurements. By A. Wilmer Duff, Professor of Physics in the Worcester Polytechnic Institute, and Arthur W. Ewell, Professor of Physics, in the Worcester Polytechnic Institute. Second Edition, Revised and Enlarged, with 78 Illustrations. 8vo. Cloth. x+258 pages. Price, $1.50. Philadelphia: P. Blakeston's Son & Co.

This manual contains a large variety of the most important experiments in the various subjects of Physics, such as Mechanics, Heat, Sound, Light, and Electricity and Magnetism. The experiments can be made with a minimum amount of apparatus. F.

Exercises From Algebra for Secondary Schools. By Charless Davison, Sc. D., Mathematical Master of King Edward's High School, Birmingham, Eng. 8vo. Cloth, vi+320 pp. Price with answers, $1.00. Cambridge, England: The University Press. G. P. Putnam's Sons, American Agents.

The book contains a fine collection of exercises and problems in the various subjects in elementary algebra from addition through the progressions, logarithms, permutation and combination, convergency and divergency of series, and exponential and logarithmic series. The answers are given at the end of the volume. The book will be found very useful to those teachers who wish to supplement the problems of the texts with well chosen problems from outside sources. F.

Principles of Physics, Designed for the Use as a Text Book of General Physics, by William Francis Magie, Ph. D., Henry Professor of Physics in Princeton University. 8vo. Cloth. ix+570 pages. Price, $3.00. New York: The Century Co.

This is a text book of rare excellence and one that will, we predict, be extensively used in our best colleges and universities. The book develops the subject in the historical order, thus putting in the clearest light those facts which are fundamental, showing the way theory grows out of facts, and leading the mind of the student along the pathway of discovery. The facts first discovered were those lying on the surface and thus most exposed. These are generally the easiest to understand. This is the reason why the historical order of study is pedagogically the best. Only a minimum of mathematics is required in reading this text. F.